

No. 779,420.

PATENTED JAN. 10, 1905.

R. HOFFMAN.  
WATER HEATER.

APPLICATION FILED JUNE 30, 1904.

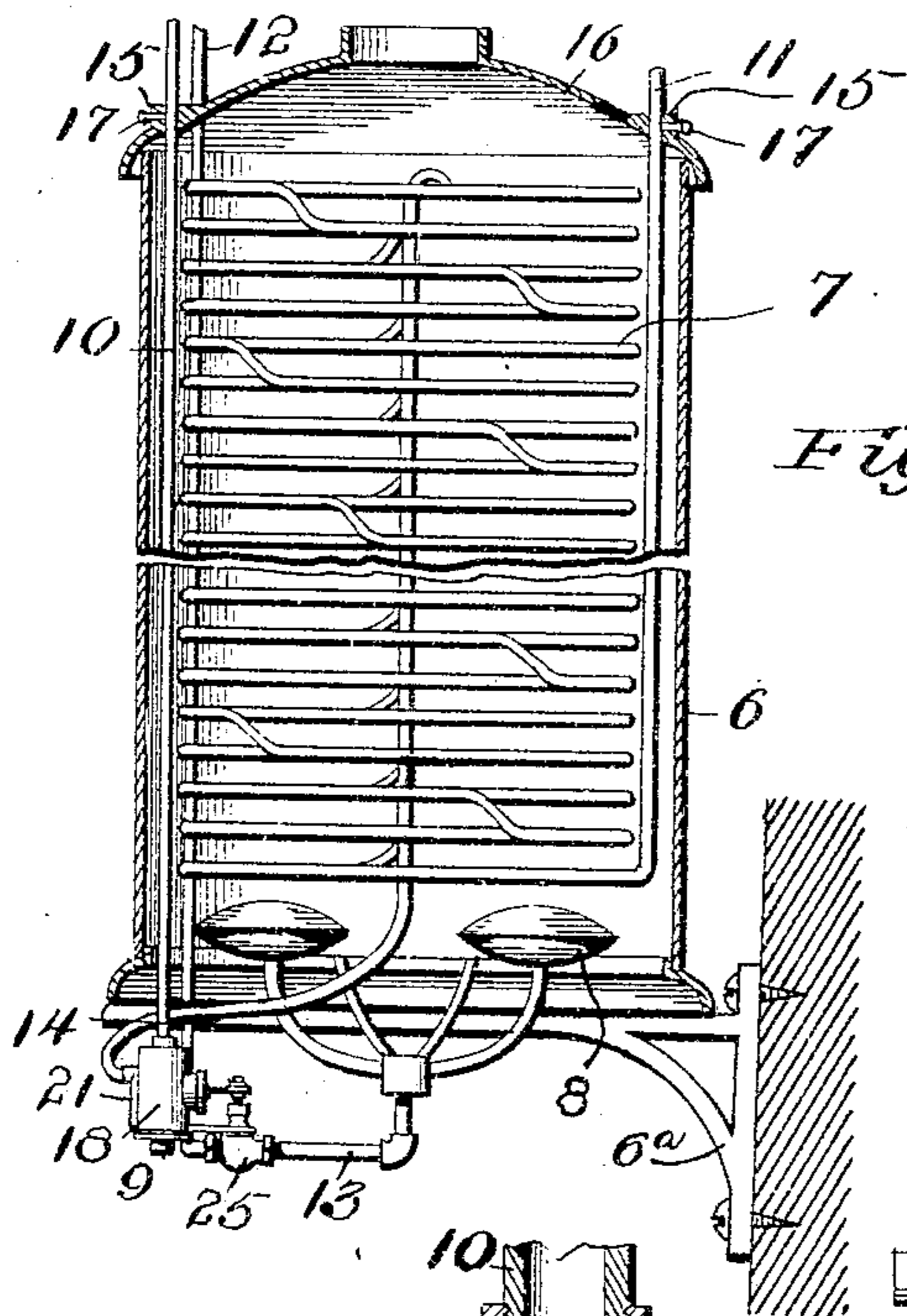


Fig. 1.

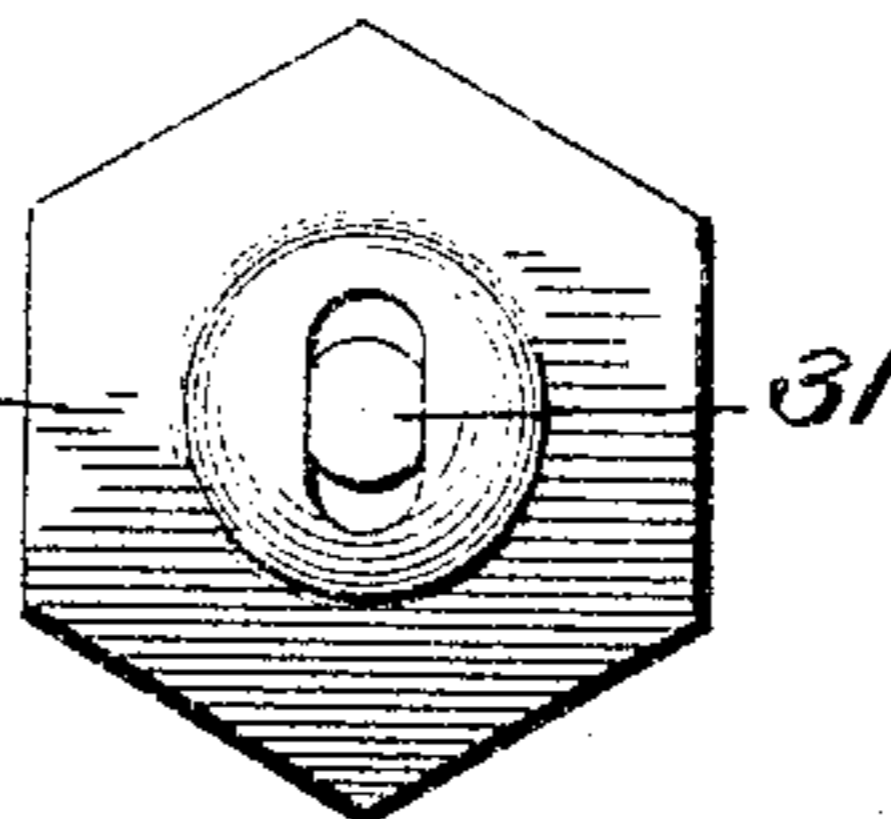


Fig. 3.

Fig. 4.

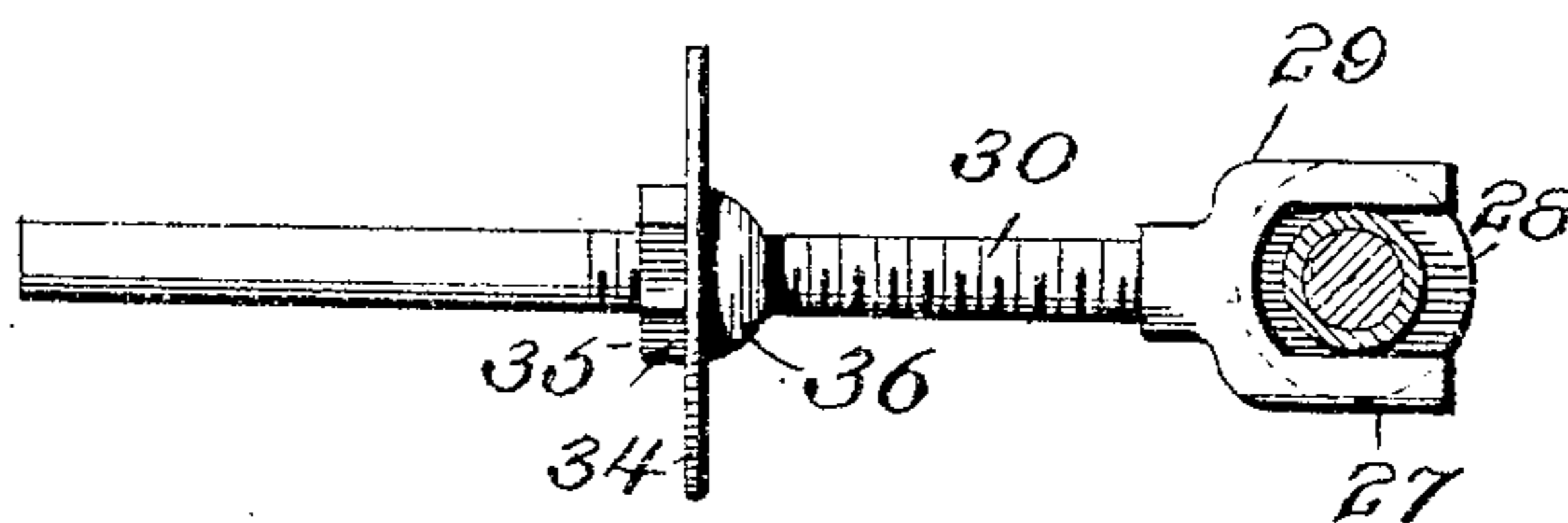
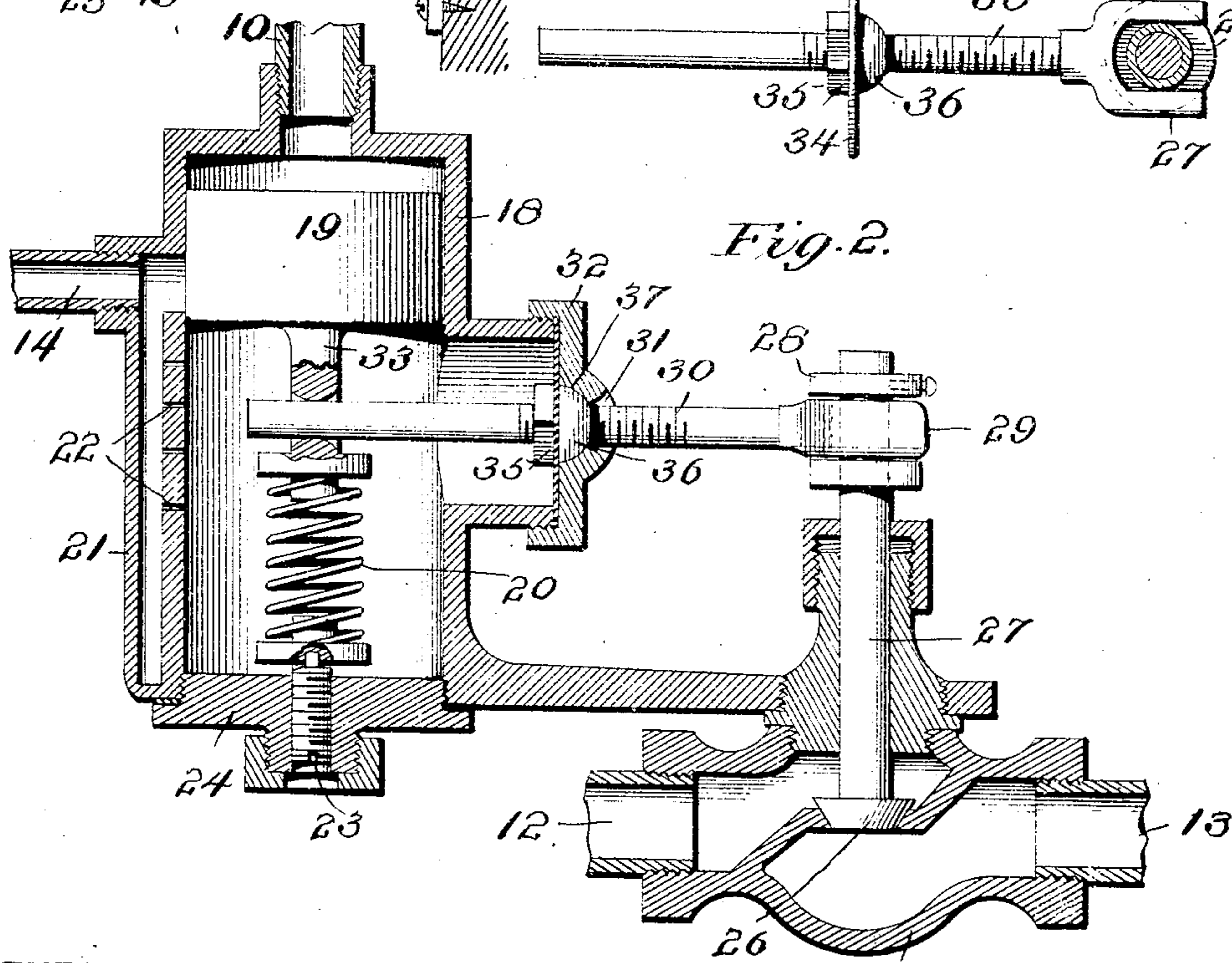


Fig. 2.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

RUDOLPH HOFFMAN, OF LORAIN, OHIO.

## WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 779,420, dated January 10, 1905.

Application filed June 30, 1904. Serial No. 214,746.

*To all whom it may concern:*

Be it known that I, RUDOLPH HOFFMAN, a citizen of the United States, residing at Lorain, in the county of Lorain and State of Ohio, have invented new and useful Improvements in Water-Heaters, of which the following is a specification.

This invention relates to that class of water-heaters in which the water is heated while flowing through a set of coils heated by a gas or similar burner; and the objects of the invention are to improve the construction of such a heater particularly with respect to the arrangement of the inlet and outlet pipes and with respect to an automatic valve for controlling the supply of gas to the burner. The valve is of that class which is operated by a water-supply. When the water is turned on the gas is turned on, and vice versa. A novel form of joint connection is shown between a water-operated piston and the stem of the gas-valve.

In the accompanying drawings, Figure 1 is a vertical sectional view of the heater with the valve in elevation. Fig. 2 is a central vertical section of the valve. Fig. 3 is a plan of a cap on the piston-chamber. Fig. 4 is a plan of the rod which connects the piston and the stem of the gas-valve.

Referring specifically to the drawings, 6 indicates the heater-casing, preferably circular in form; 7, the coils therein; 8, the burner under the coils; 9, the valve as a whole; 10, the water-inlet pipe; 11, the water-outlet pipe; 12, the gas-inlet pipe to the valve; 13, the gas-pipe from the valve to the burner, and 14 the water-pipe from the valve to the coils.

The inlet and outlet pipes 10, 11, and 12 extend within the casing, being let through heavy collars 15, formed on the top 16 of the casing and fixed in the collars by set-screws 17. The water-supply pipe 10 extends down from the casing to the valve, and the connecting-pipe 14 extends from the valve up through the middle of the burner to the top coil of the coils 7, and the outlet-pipe 11 is connected to the bottom coil. The water thus enters the heater at the top of the coils and travels downwardly through the same and is delivered

from the hottest part thereof. The top or dome 16 is fixed to and upon the pipes, as above stated, and all the parts are contained within the shell or casing 6. This permits the shell to be lowered away from the top or dome and removed therefrom for the purpose of cleaning the coils or for other purposes. This may be done without disconnecting any of the pipes, since, as stated before, the pipes all pass through the dome. This is an important advantage and prevents disturbance of the mechanism by plumbers or others. When in position, the shell may be supported by any kind of removable stand or bracket. Such a bracket is indicated at 6<sup>a</sup>.

Referring particularly to the automatic valve, 18 indicates a cylinder having therein a piston 19, which receives pressure from the water admitted through the supply-pipe 10, and when the water is turned on the piston is forced back, letting out the water to the pipe 14 through an opening in the side of the cylinder. When the water is turned off, the pressure of a spring 20 behind the piston advances the same and covers the said opening. To balance the piston and allow escape of water in the cylinder behind the piston, a by-pass 21 is formed on the outside of the cylinder, communicating with the pipe 14 and through a number of small orifices 22 in the side of the cylinder. The tension of the spring is regulated by a screw 23, tapped through the screw-plug 24 in the bottom of the cylinder.

A gas-valve casing is indicated at 25, connected to the pipes 12 and 13. The valve is shown at 26, and the outer end of the stem 27 thereof has thereon an adjustable spool 28. This spool receives between its flanges the fork 29, carried at the end of a lever-rod 30. This rod extends through a slot 31 in a cap 32, screwed on a nipple around an opening in the side of the cylinder 18, and thence the rod extends into a hole in the stem 33 on the back side of the piston 19. The slot 31 allows the lever-rod 30 to vibrate according to the movement of the piston 19, and a water-tight joint is formed by a rubber diaphragm or disk 34, the outer edge of which is clamped under the cap 32. The rod 30 extends through

the middle of this disk, which is clamped to the rods between nuts 35 and 36 thereon. The inside of the cap 32 has a semicircular or rounded depression, as indicated at 37, and  
 5 the nut 36 is rounded accordingly to fit in this depression, so that the rod may turn or vibrate readily, which action is permitted by the elasticity of the rubber disk 34.

In operation when the water is turned on  
 10 the piston 19 is forced down, which turns the lever-rod 30 on the cap 32 as a fulcrum, causing the lift of the valve 26 from its seat and opening the gas-supply to the burner. When the water is turned off, the piston is caused to  
 15 rise by means of the spring 20, which shuts off the gas-valve. The adjustment of the spool 28 and the spring 20 enables the parts to be set to operate as desired. The use of the rubber disk, connected around the rod 20,  
 20 avoids the necessity for a stuffing-box or packing, and there is much less liability of leakage than with ordinary constructions. When the rubber disk becomes worn out, it is a simple matter to unscrew the cap 32, take out the  
 25 rod, and put on a new disk.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a water-heater, the combination with heating-tubes and a burner thereunder, and  
 30 proper water and gas inlet and outlet pipes thereto, of a shell around the same, a support for the shell, and a separable end on the shell, through which end all the pipes extend, the end being supported on the pipes, per-  
 35 mitting the shell to be removed without disconnecting any of the pipes.

2. In a water-heater, the combination with heating-coils, a burner thereunder, and suitable supply and outlet pipes thereto, of a removable shell around the coils and burner, a  
 40 support for the shell, and a top on the shell supported by said pipes and through which they extend.

3. The combination with a gas-valve, a lever connected thereto, and a cylinder having  
 45 a water-operated piston therein, and an opening through which the lever extends to connection with the piston, of a flexible disk around the lever, across said opening.

4. The combination with a gas-valve, and a  
 50 lever connected thereto, of a casing having an opening through which the end of the lever extends, fluid-operated means in the casing to work the lever, and a flexible packing-disk extending across the opening and around the  
 55 lever.

5. The combination with a cylinder having an opening with a slotted cap thereover, and a piston in the cylinder, of a lever-rod extending through the slot and connected with the  
 60 piston, a flexible disk secured to the rod and extending across the slot, with its outer edge clamped under the cap, and a valve connected to and operated by the said rod.

In testimony whereof I have signed my name  
 65 to this specification in the presence of two subscribing witnesses.

RUDOLPH HOFFMAN.

Witnesses:

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 LOTTIE NEWBURN.